Borehole # 10-06-07

Log Event A

Borehole Information

Farm : A	**Tank :** A-106	**Site Number :** 299-E25-77
N-Coord : 41,264	**W-Coord :** 47,622	**TOC Elevation :** 687.25
Water Level, ft :	**Date Drilled :** 2/28/1962	

Casing Record

Type : Steel-welded	Thickness, in. : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 125	

Cement Bottom, ft. : 130 **Cement Top, ft. :** 125

Borehole Notes:

Borehole 10-06-07 was drilled in February 1962 to a depth of 75 ft with 6-in. casing. Data from the drilling log and Chamness and Merz (1993) were used to provide borehole construction information. In July 1978, this borehole was deepened to 130 ft and the 6-in. casing was extended to a depth of 125 ft. An 18-ft length of temporary 8-in. surface casing was installed to facilitate the deepening of the borehole. The annulus between the 6-in. borehole casing and the 8-in. surface casing was stemmed with grout from 18 ft to the ground surface as the surface casing was removed. The bottom of the borehole was backfilled with grout from 130 to 125 ft. There is no mention that the 6-in. casing was perforated.

"As-built" drawings for the A Tank Farm indicate the original borehole was constructed with 6-in., schedule-30 pipe; however, this type of pipe was not identified in applicable engineering references. The thickness of the borehole casing is assumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. casing.

The top of the borehole casing, which is the zero reference for the SGLS, is approximately flush with the ground surface.

Equipment Information

Logging System : 1	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 10/1996	**Calibration Reference :** GJO-HAN-13	**Logging Procedure :** P-GJPO-1783

Logging Information

Log Run Number : 1	**Log Run Date :** 10/18/1996	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 0.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 24.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Log Run Number :	2	**Log Run Date :**	10/23/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	123.5	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	71.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	3	**Log Run Date :**	10/24/1996	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	72.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	23.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Logging Operation Notes:

This borehole was logged by the SGLS in three log runs. The total logging depth achieved was 123.5 ft.

Analysis Information

Analyst : E. Larsen

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 03/18/1998

Analysis Notes :

The pre-survey and post-survey field verification for each logging run met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from the accepted calibration spectrum that most closely matched the field data were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for a 0.280-in.-thick steel casing was applied to the concentration data during the analysis process.

Shape factor analysis was applied to the SGLS data and provided insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

A plot of the shape factor analysis results is also included. The plot is used as an interpretive tool to help

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determine the radial distribution of man-made contaminants around the borehole.

Results/Interpretations:

The man-made radionuclide Cs-137 was detected in this borehole. The Cs-137 contamination was measured nearly continuously from the ground surface to a depth of 42 ft and from 113 ft to the bottom of the logged interval (123.5 ft). Intermittent zones of isolated and continuous Cs-137 contamination were detected between 49.5 and 111.5 ft.

A zone of relatively low K-40 concentration values was detected between 10 and 15 ft. Relatively decreased U-238 concentrations occur from 25 to 71 ft. Relatively increased KUT concentration values occur from about 112 ft to the bottom of the logged interval.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank A-106.